TWO NEW SPECIES OF TUBEROUS LOMATIUMS (UMBELLIFERAE)

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Abstract

Two species of tuberous lomatiums are described. *Lomatium quintuplex* is found only on Umtanum Ridge, between Ellensburg and Yakima, Washington. *Lomatium stebbinsii* is restricted to the west slope of the Sierra Nevada in Tuolumne and Calaveras counties, California. Neither species is closely related to other tuberous lomatiums.

The tuberous lomatiums constitute an easily recognized infrageneric group. This assemblage is characterized by a low, usually acaulescent habit, tuberous roots, leaves with linear segments, and fruit with an elliptical outline and narrow, thin lateral wings. The center of distribution and species diversity of this group is the Columbia River Plateau of eastern Washington and Oregon and adjacent Idaho, where it forms a conspicuous element of the early spring flora. Tuberous lomatiums typically occur in gravelly, thin soils of hillsides, ridges and scablands, and other open, windy habitats that dry up early in the growing season. It is probably in response to this environment that their distinctive features have evolved. Coulter and Rose (1888) treated the tuberous lomatiums as an infrageneric unit and Jones (1908) named them section *Cous*. Mathias (1938) and Mathias and Constance (1945) retained the group for purposes of identification but made no decision as to whether or not it is an entirely natural one.

The existence of low, acaulescent, tuberous species of *Tauschia* and *Orogenia* in the same habitats occupied by tuberous lomatiums indicates that these features may have evolved more than once in western North American Umbelliferae. These characters may also have several origins within diverse, widespread genera such as *Lomatium*. Interspecific variation in morphology and flavonoid chemistry led Brehm and French (1966) and Schlessman (1976) to hypothesize that the tuberous lomatiums are not a natural group. Recognition of two new tuberous lomatiums without close morphological affinities to any other member of the group tends to support this hypothesis.

Lomatium quintuplex Schlessman & Constance, sp. nov.

Herba perennis, acaulescens, caule conspicuo subterraneo (pseudoscapo) vaginis scariosis 2–5 vestito, e glabra ad scabridisculam varians, 1.5–3 dm alta; radix tuberosa, irregularis, usque ad 5 cm longa, 3 cm lata, 2 cm crassa; folia 3–8, ovata; lamina quinata-bipinnata, 5–12 cm longa, 2.5–6 cm lata, divisionibus ultimis e linearis ad filiformis varianes, 1–3 mm longis, minus quam 1 mm latis; petioli 2–6 cm longi,

scariosis, omnino vaginatis; pedunculi 2–5, 15–20 cm longi, folia excedentes; radii fertiles 5–8, patenti-adscendentes, inequales, 2–8 cm longi; involucellum dimidiatum, bracteolis 3–5, anguste lanceolatis, 2–4 mm longis, scarioso-marginatis; petala, antherae at stylopodia citrini; pedicelli fructificantes 7–17 mm longi; fructus ellipticus, 7–9 mm longus, 3 mm latus, glabris, alis tenuibus, 0.5 mm latis; vittae pusillae, in valleculis 4–7, ad commissuras nullis (Fig. 1).

Acaulescent perennial with a prominent underground stem (pseudoscape) bearing leaves at ground level and clothed by 2–5 scarious, dilated, bladeless sheaths, glabrous to minutely scabrous, 1.5–3 dm tall; root tuberous, irregular, up to 5 cm long, 3 cm wide and 2 cm thick; leaves 3–8, ovate in general outline; blades quinately then bipinnately dissected, 5–12 cm long, 2.5–6 cm wide, the ultimate divisions linear to filiform, 1–3 mm long, less than 1 mm wide, the apices acute; petioles 2–6 cm long, sheathing throughout, the margins scarious; peduncles 2–5, 15–20 cm long, exceeding the leaves; fertile rays 5–8, spreading-ascending, unequal, 2–8 cm long; involucel dimidiate, of 3–5 narrowly lanceolate bractlets 2–4 mm long, the margins scarious; umbellets 15–20 flowered; calyx teeth obsolete; petals, anthers and stylopodia yellow; styles 1.5 mm long and spreading at maturity; pedicels 7–17 mm long in fruit; fruit dorsally compressed, elliptic in outline, 7–9 mm long, 3–4 mm wide, glabrous, the wings thin, 0.5 mm wide, vittae small, 4–7 in the intervals, absent on the commissure.

Type: United States: Washington: Kittitas Co., east-facing gravelly slope near the summit of North Umtanum Ridge, on west side of Interstate 82, just north of milepost 17, 17 miles (27.2 km) south of Ellensburg or 6.8 miles (10.9 km) north of bridge over Selah Creek, 695 m, with *Lewisia rediviva, Lomatium farinosum* var. *hambleniae, Eriogonum, Erigeron* and *Collomia,* 25 May 1978, *Schlessman 792* (Holotype: WTU; Isotypes: NY, UC, WS).

Distribution: Rocky, basaltic slopes of Umtanum Ridge, located between Ellensburg and Yakima, Washington, 690–970 m.

Phenology: Leaves appear in March; flowers from early April to early May; fruits mature from late April through early June.

Specimens examined: United States: Washington: Kittitas Co.: ca. 20 miles (32 km) north of Yakima, along Durr Road on Umtanum Ridge, south-facing slope, 10 April, 5 May and 7 June, 1976, *Thomas G. Nielsen s.n.* (UC, WS, WTU); 2 miles (3.2 km) north of Kittitas-Yakima county line or 17 miles (27.2 km) south of Ellensburg, just east of elevation sign on Interstate 82 at North Umtanum Ridge, 694 m, 28 April 1976, *Schlessman 236* (WTU); basaltic east-southeast-facing slope at hairpin turn in Durr Road, 7 miles (11.6 km) north of entrance to L.T. Murray game area north of Selah, Umtanum Ridge, 969 m, 15 May 1977, *Schlessman 641* (WTU); east-facing gravelly slope just below summit of ridge on west side of Interstate 82, milepost

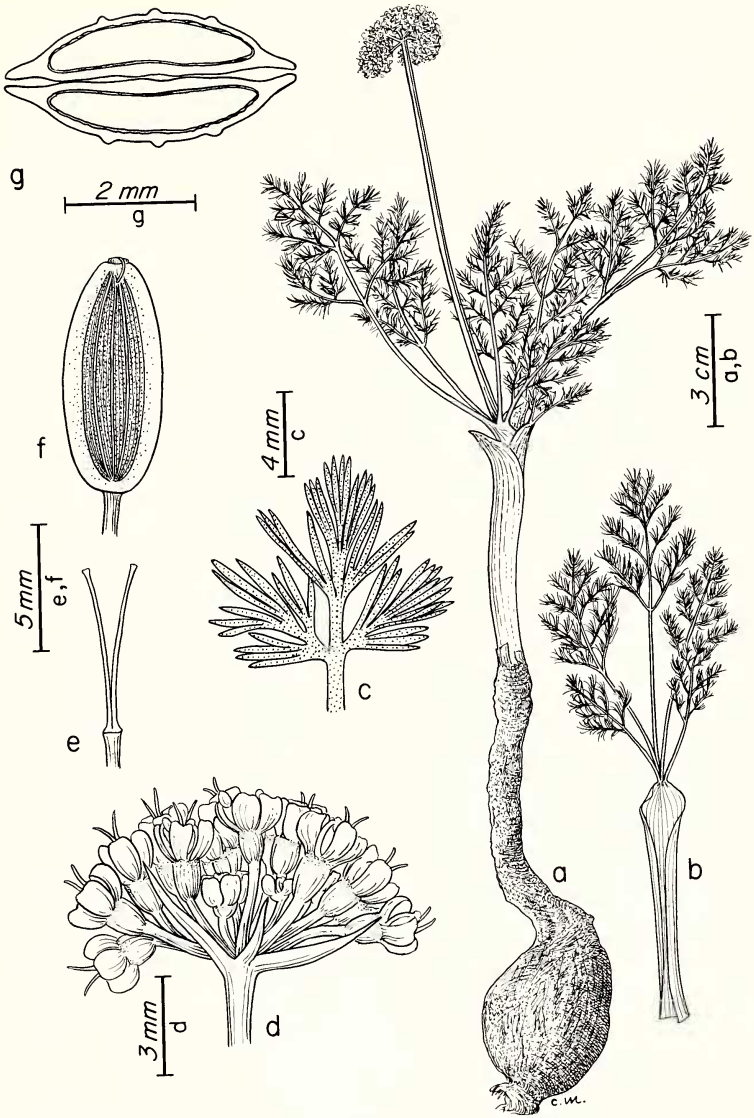

FIG. 1. *Lomatium quintuplex*. a. Habit. b. Leaf. c. Ultimate divisions of the leaves. d. Flowering umbellet. e. Carpophore. f. Dorsal view of fruit. g. Transection of fruit. a.–e. from *Thomas G. Nielsen s.n.*, f. and g. from *Schlessman 792*.

17, North Umtanum Ridge, 694 m, 14 April 1978, *Schlessman 719* (WTU); North-northeast-facing slope just below hairpin turn in Durr Road, L.T. Murray Wildlife Recreation Area, 13 miles (20.8 km) north of Selah, 915 m, 15 April 1978, *Schlessman 722* (WTU); North Um-

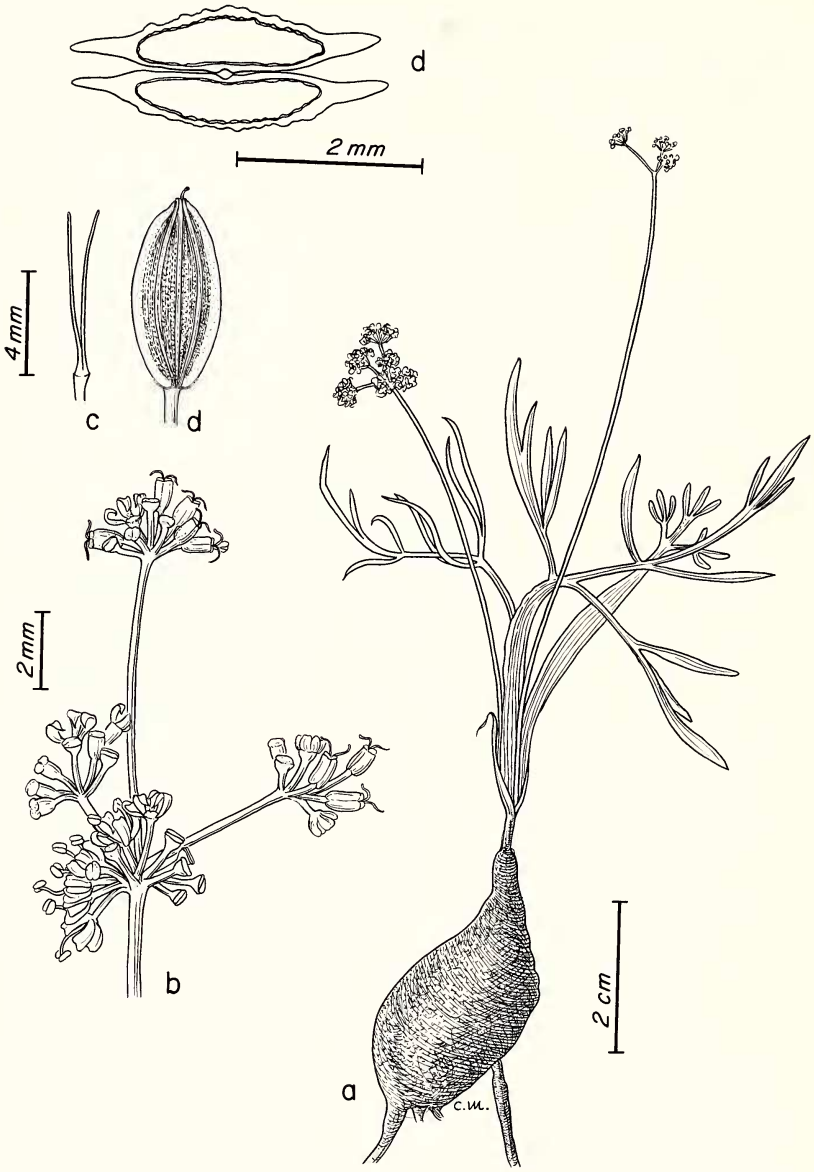

FIG. 2. *Lomatium stebbinsii*. a. Habit. b. Single umbel. c. Carpophore. d. Dorsal view of fruit. e. Transection of fruit. a. and b. from *Stebbins 9031*, c.–e. from *G. L. Stebbins s.n.*, 18 June 1971.

tanum Ridge, lithosol, Upper Sonoran, at edge of east side of Interstate 82, just north of the summit of the ridge, associated with *Viola trinervata, Lomatium canbyi, L. macrocarpum* and *Eriogonum,* ca. 2400 ft. (727 m), 8 April 1978, *E. Hunn 897* (WTU); 7.6 miles (12.2 km) north of L.T. Murray on Durr Road, 1.4 miles (2.2 km) north of Yakima Co. line, on south side of Umtanum Ridge, ca. 2800 ft. (848 m), 15 April 1978, *E. Hunn* 906 (WTU).

Derivation of the epithet: From the Latin, in reference to the quinately divided blades of the leaves.

Lomatium quintuplex was discovered by Mr. Thomas G. Nielsen, an inquisitive and persistent amateur botanist who has collected extensively in the Yakima region. We are especially grateful for his assistance in locating the Durr Road population.

The filiform ultimate segments of the leaves of *Lomatium quintuplex* closely resemble those of *L. bicolor* (Watson) Coulter & Rose from Idaho, northern Utah, and Wyoming. The new species differs from *L. bicolor* in having quinately rather than ternately divided leaves, more flowers per umbellet, shorter bractlets, longer fruiting pedicels and shorter, wider fruit.

Dr. Amy Jean Gilmartin (unpub. data) has used numerical analyses of a large number of morphological characters to determine the phenetic dissimilarities among population samples of *Lomatium quintuplex* and four other lomatiums. The taxa chosen for comparison were *L. leptocarpum* (Torrey & Gray) Coulter & Rose, *L. ambiguum* (Nuttall) Coulter & Rose, *L. howellii* (Watson) Jepson and *L. triternatum* (Pursh) Coulter & Rose. *Lomatium leptocarpum* and *L. ambiguum* are tuberous lomatiums, the former having been treated as conspecific with *L. bicolor* (Mathias, 1938; Mathias and Constance, 1945). The mean phenetic distances (MPD's) between *L. quintuplex* and each of the other taxa are approximately equal and within the range expected for comparisons of distinct species. The phenetic dissimilarities between the new species and the other tuberous lomatiums are the same as those between the new species and the presumably more distant taxa. *Lomatium quintuplex* is morphologically distinct and apparently not closely related to other tuberous lomatiums.

Lomatium stebbinsii Schlessman & Constance, sp. nov.

Herba perennis, acaulescens, aliquando caule subterraneo (pseudoscapo), glabra, 5–15 cm alta; radix tuberosa, globosa usque ovoidea, 0.7–2 cm diametro; folia 2–5, triangulares; lamina 2–5 cm longa, e ternatis ad ternatis-pinnatis variantes, divisionibus ultimis linearis, 2–12 mm longis, 1–2 mm latis; petioli 2–3 cm longi, ad medium vel aliquando omnino vaginati; pedunculi 1–3, 4–15 cm longi, patentes, folia excedentes; radii 2–7, patentes, inequales, 1–12 mm longi; involucellum nullum; petala, antherae et stylopodia citrini; pedicelli fructificantes 1–2 mm longi; fructus ellipticus, 6–9 mm longus, 3–4 mm

latus, glabris, alis 0.5–1 mm latis; vittae pusillae, in valleculis 1–4, ad commissuras nullis; $n = 11$ (Fig. 2).

Acaulescent perennial, occasionally with an underground stem (pseudoscape) bearing leaves at ground level, glabrous, 5–15 cm tall; root tuberous, globose to ovoid, 0.7–2 cm in diameter; leaves 2–5, triangular in general outline; blades 2–5 cm long, ternate to ternate pinnate, the ultimate divisions linear, 2–12 mm long, 1–2 mm wide, often narrowed toward the base, the apices acute; petioles 2–3 cm long, sheathing to the middle or occasionally throughout; peduncles 1–3, 4–15 cm long, spreading, exceeding the leaves; rays 2–7, spreading, unequal, 1–12 mm long; involucel lacking; umbellets 2–15 flowered; petals, anthers and stylopodia lemon-yellow; pedicels 1–2 mm long in fruit; fruit dorsally compressed, elliptic in outline, 6–9 mm long, 3–4 mm wide, glabrous, the wings 0.5–1 mm wide; vittae small, 1–4 in the intervals, absent on the commissure; $n = 11$.

TYPE: United States: California: Tuolumne Co.: 4 miles (6.4 km) east of Long Barn on northeast side of Bald Mt., S2 T3N R17E, gravelly open volcanic slope and ridge crest with *Allium, Calyptridium, Arabis, Crepis, Penstemon,* and *Ceanothus; Pinus ponderosa* association; peduncles spreading, nearly prostrate, fruits shining, heavily grazed by rabbits, 4100 ft. (1242 m), 26 May 1978, *Constance 3895* (Holotype: WTU; Isotypes: NY, UC, WS).

Distribution: Thin, gravelly volcanic soils in open *Pinus ponderosa* forest, 1200–1700 m on the western slope of the Sierra Nevada in Tuolumne and Calaveras counties, California.

Phenology: Leaves appear in March; flowers from late March to early April; fruits mature from mid April through mid June.

Specimens examined: United States: California: Tuolumne Co.: scattered over the thin-soiled, almost bare ground on volcanics (mud flow breccia) northwest of Bald Mt., close to Sonora Pass road (Hwy. 108), 5600 ft. (1700 m), 18 June 1971, *G. L. Stebbins s.n.* (DAV, UC); clearing in forest of *Pinus ponderosa,* on thin soil of volcanic formation, 1 mile (1.6 km) southwest of Confidence, near county road to Tuolumne, S10 T2N R16E, 4100 ft. (1242 m), 25 March 1973, *Stebbins 9031* (DAV, UC); around rocks on gravelly flat with *Allium, Lupinus, Dudleya, Sitanion,* and *Microsteris* with scattered *Arctostaphylos* and *Ceanothus,* a natural opening in *Pinus ponderosa-Calocedrus* forest, 1 mile (1.6 km) southwest of Confidence, ca. 4100 ft. (1242 m), 24 March 1978, *Constance 3892* (UC, WTU); gravelly open volcanic slope and ridge crest with *Claytonia, Allium,* and *Microsteris* in *Pinus ponderosa-Calocedrus* association, 4 miles (6.4 km) east of Long Barn on northeast side of Bald Mt., S2 T3N R17E, 4100 ft. (1242 m), Sierra Nevada, 24 March 1978, *Constance 3893, n* = 11 (UC, WTU). Calaveras Co.: Folsom Guard Station, 14 miles (22.4 km) east of West Point, 29 May 1972, *G. L. Stebbins s.n.* (DAV).

Derivation of the epithet: Named in honor of the discoverer, G. Ledyard Stebbins.

Lomatium stebbinsii occurs at the southern limit of the range of tuberous lomatiums. The yellow flowers and spreading peduncles of the new species give it a superficial resemblance to *L. farinosum* var. *hambleniae* (Mathias & Constance) Schlessman, a taxon confined to the scablands and steppe of central Washington and Oregon. *Lomatium stebbinsii* differs from the latter in having an irregularly shaped root, a shorter and less slender pseudoscape, wider and shorter divisions of the leaves, no involucel, much shorter fruiting pedicels and somewhat wider fruit. The low stature, short fruiting pedicels and relatively short segments of the leaves of *L. stebbinsii* are more similar to *L. piperi* Coulter & Rose, or to *Tauschia hooveri* Mathias & Constance, than to *L. farinosum* var. *hambleniae*. *Lomatium stebbinsii* appears to have no close relatives among the tuberous lomatiums.

The relative obscurity of early-flowering umbels is underscored by the fact that these new species appear to have gone unnoticed until they were recently collected by Mr. Nielsen and Professor Stebbins.

Acknowledgments

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